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TECHNICAL REVIEW OF CLOSURE PLAN
YAKIMA AGRICULTURAL RESEARCH LABORATORY
YAKIMA, WASHINGTON

DRAFT REPORT

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
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1.0 INTRODUCTION

PRC Environmental Management, Inc., received a work assignment from the U.S. Environmental Protection Agency (U.S. EPA) Region 10 to provide technical support in the review of a closure plan submitted by the Yakima Agricultural Research Laboratory (YARL), Yakima, Washington. YARL submitted the plan in response to a request from the Washington Department of Ecology (WDOE). The closure plan was developed to ensure compliance with WDOE guidelines and U.S. EPA interim status standards contained in 40 CFR 265. WDOE requires all sites under investigation to institute ground-water monitoring and soil sampling programs to determine whether cleanup is needed. As part of the closure plan, YARL submitted details of monitoring programs designed to determine existing or potential ground-water and soil contamination.

2.0 REVIEW PROCESS

PRC reviewed the following documents supplied by U.S. EPA Region 10 to evaluate the adequacy of YARL's closure plan in accordance with 40 CFR 265 and U.S. EPA's Draft RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (1985).

- Plan amendment and revision of the closure plan for pesticide disposal drainfield, YARL, September 30, 1985.
- Final cleanup policy - technical, Washington Department of Ecology. Effective date: July 10, 1984.
- Directive 600.12, U.S. Department of Agriculture - Agricultural Research Service, Washington, D.C., May 10, 1985.
- Letter from Mr. Don Reale, WDOE to the Director, YARL, dated May 24, 1985.
- Closure plan review conducted by WDOE, August 13, 1985.

To aid in the evaluation, PRC prepared and completed a compliance checklist, which is included in the appendix to this report.

3.0 FACILITY OVERVIEW

YARL is a research laboratory, affiliated with the U.S. Dept. of Agriculture - Agricultural Research Station. According to the documents reviewed, YARL has been in operation since the late 1920's and is involved in developing insect control technology for fruits and vegetables. Until recently, YARL used insecticides in most of its studies. The following paragraphs describe YARL's waste disposal system, its operation, and site geologic and hydrologic characteristics. PRC could not present a general description of the site because YARL did not provide this information.

YARL constructed a waste disposal system consisting of a 300-gallon capacity septic tank in 1961. The overflow effluent from the tank discharged into the ground through a 30-foot diameter drain, 2-feet below the ground (termed the drainfield). Until 1974, a sink in the insecticide storage building was the only source of insecticides into the septic tank; this sink was disconnected in 1984. In 1974, YARL constructed an outdoor surface drain, which also discharged insecticide wastes to the septic tank. These wastes consisted of excess spray mixtures and rinsates from cleaning sprayers and tractors. However, this drain was covered over with concrete in 1985, when YARL stopped insecticide disposal into the septic tank. YARL does not propose to use the septic tank for insecticide disposal in the future. Since 1985, sources of influent into the septic tank include a toilet in the storage building and outdoor surface drainage.

As described in YARL's closure plan, the site lies on soil derived from wind-blown loess, ridge erosion and volcanic ash. Underlying the soil is stream alluvium produced by the Yakima River and its tributaries. The bedrock is basaltic in nature and was produced by volcanic eruptions and lava flows. Between the bedrock and the stream alluvium lies the Ellensburg Formation, composed of alluvial sediments of gravel, sand, silt and clay.

The stream alluvium is the uppermost source of ground water for the site. WDOE personnel conducted a survey to determine the direction of ground water

flow, and depth to ground water at the vicintiy of the YARL site. They reported that the ground water flows in a south southeast direction, with a 45 degree variation at any given location. WDOE measured ground-water levels at 9.1 and 19.4 feet at two locations. However, a local well driller indicated that ground water may exist at a depth of 4 feet.

4.0 CLOSURE PLAN

This section summarizes the information in YARL's closure plan.

YARL submitted a closure plan for the septic tank drainfield system in 1985. According to the plan, YARL does not intend to flush out or close the septic tank, but proposes to conduct further research on the septic tank disposal system in cooperation with WDOE.

The plan states that, starting in 1981, YARL sent three shipments of unwanted insecticide concentrates for disposal to the Chem-Security Systems facility in Arlington, Oregon via a licensed waste hauler. However, the plan does not indicate the procedures that YARL followed for disposing of excess or unwanted insecticides prior to 1981.

The plan also indicates that YARL has changed the focus of its research in recent years. As a result, insecticide research is no longer a major program. In the future, YARL will keep its insecticide inventory at a minimum. YARL personnel will spray excess insecticide concentrates and sprays onto overplanted plots in accordance with U.S. Department of Agriculture Directive 600.12. Also, YARL will maintain the volume of unused insecticides at the facility to below 55 gallons per year; outdated or otherwise unwanted insecticides will be shipped for disposal to the Chem-Security facility in Arlington through a licensed transporter.

Since YARL does not propose to remove the septic tank and the drainfield system designed to discharge waste to the ground, PRC determined the septic system disposal facility meets the definition of a landfill 40 CFR 260, Subpart B. PRC conducted a review to determine if YARL closure plan complies with regulations for landfill closure in 40 CFR 265, Subparts G and N. The results of our review are summarized in Sections 6 and 7 of this report.

5.0 GROUND-WATER MONITORING AND SOIL SAMPLING PROGRAMS

YARL's closure plan consists of ground-water monitoring and soil core sampling programs to determine the nature and extent of insecticide residue movement. These proposed programs are summarized below.

5.1 GROUND-WATER MONITORING

The ground-water monitoring program proposed by YARL involves installation of wells under the supervision of a qualified geologist or a geotechnical engineer. YARL proposes to install one upgradient well and three downgradient wells, at a distance of 30 feet from the outside sealed drain. Figure 1 shows the locations of the downgradient monitoring wells. The upgradient well is located at the northwest corner of the site, which is outside the area shown in this figure. An air rotary drilling rig with a casing hammer will be used to place 6-inch-diameter steel casing up to a depth of 30 feet. The plan proposes to withdraw steel casings later and place 2-inch-diameter, flush-threaded PVC pipe (piezometer) with 10 feet of slotted screen inside the boreholes. All drilling tools, casings, and PVC pipes and screens will be steam cleaned prior to well installation. The annular space outside of the slotted screen will be filled with filtered sand and with grout/bentonite slurry above the sampling depth. YARL proposes to place multiple nested piezometers in a single borehole if ground water exists at depths of 10 feet or less. The annular space in each case will be sealed with cement. A locking monument case consisting of a steel pipe with a vented cover will be installed over each well at the surface.

Each well will be developed using a pump and surge technique, then water levels will be measured. Specific conductance and pH will be measured following withdrawal of five well volumes of water. A dedicated submersible pump will be used for sampling. Samples will be sent to a qualified commercial analytical laboratory. YARL provided details on chemical parameters to be analyzed, sample sizes required for each analysis, and quality assurance programs.

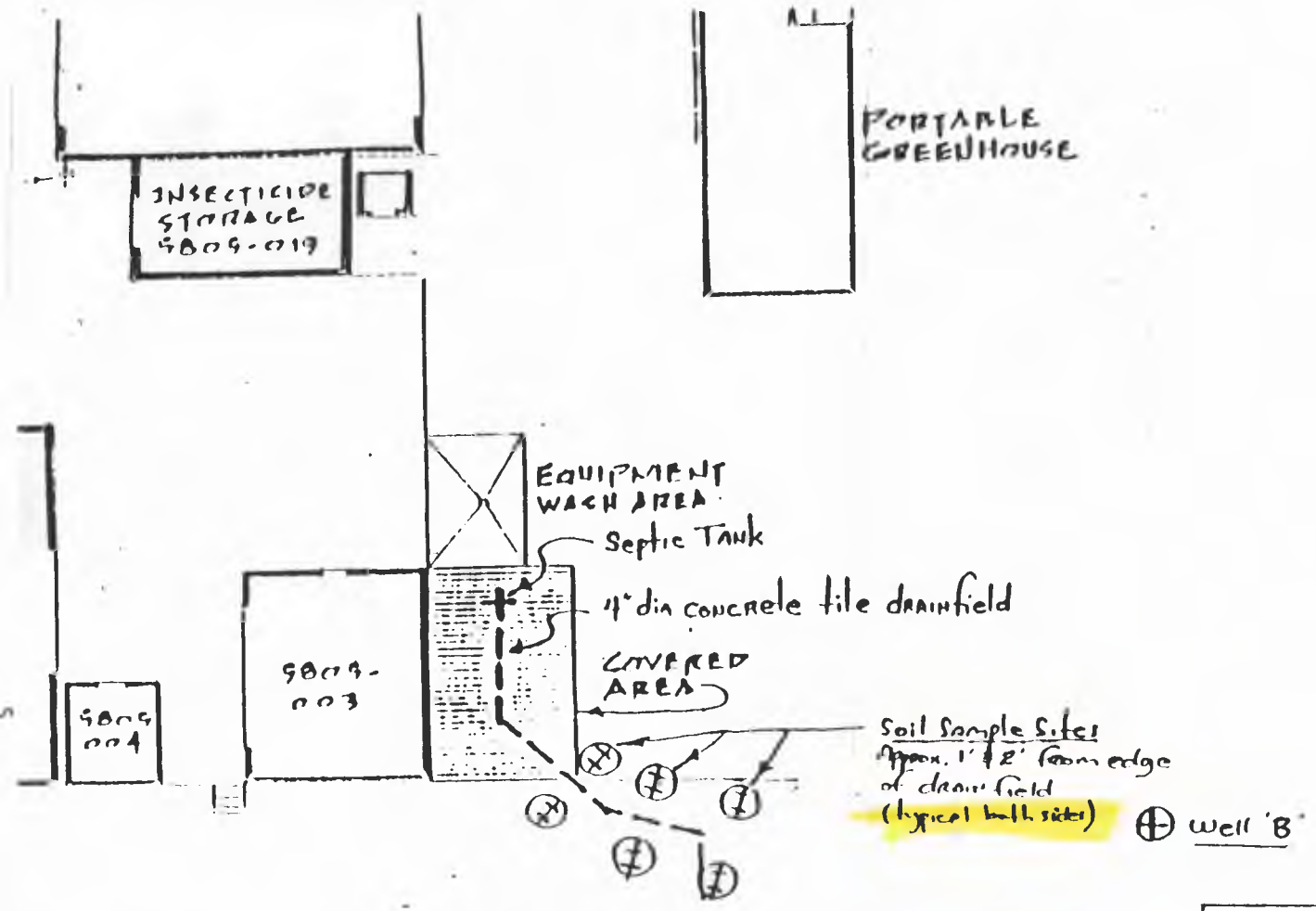

Figure 1

Downgradient Soil and Ground-water Sampling Locations

Reproduced from YARL's Closure Plan,

September 30, 1985

5.2 SOIL SAMPLING

Soil samples will be collected at depths of 6 inches, 2 feet, and 4 feet. Background samples will be collected at the same location as the upgradient groundwater samples. Remaining samples will be collected from locations near the drainfield (Figure 1). Soil cores will be taken manually, if possible. A tractor-mounted soil auger or Gitting's soil sampler may be used at deeper depths. YARL provided details of soil sampling protocols and parameters to be analyzed for. Samples will be processed by a commercial laboratory.

YARL proposes to submit to WDOE a preliminary report, which will contain an evaluation of contaminant movement based on statistical analyses of downgradient versus upgradient sampling results. The plan provides a table of events that describe the schedule for monitoring well installation, sampling, analyses, and review of pertinent data.

YARL further proposes that it will take post-closure actions if contamination is demonstrated. The post-closure contingency plan includes monitoring, removal, and disposal of the septic tank, drainfield, and contaminated soils, and decontamination of toxic wastes on-site.

6.0 COMMENTS ON THE CLOSURE PLAN

It appears that the major thrust of the closure plan is to comply with WDOE regulations in determining the level of cleanup required. In its present format, the closure plan appears to be a proposal for continuing operations at the site on an interim basis. The post-closure contingency plan describes actions that more closely meet requirements specified for closure plans.

YARL's closure plan does not include construction of a final cover over the landfill as required by provisions described in 40 CFR 265.310 for landfill closure. In addition, the closure plan fails to demonstrate that further degradation of the environment will be minimized. Continued use of the septic tank disposal system, intentional (such as effluent from the toilet in the storage building) or unintentional, could possibly pose a threat to human health or the environment. Moreover, although YARL proposes to institute monitoring programs specifically

designed to detect possible downstream contaminant movement, the closure plan does not address containing, controlling, or minimizing such movement. Also, the closure plan does not identify which units YARL proposes to close.

7.0 SUMMARY OF REGULATORY DEFICIENCIES

PRC identified several regulatory deficiencies in the closure plan. These are summarized below.

- YARL did not indicate the estimated year of closure [40 CFR 265.112(a)].
- YARL did not state whether a copy of the closure plan is kept at the facility [40 CFR 265.112(a)].
- YARL did not provide information on amending the closure plan [40 CFR 265.112(b)].
- YARL did not state whether documentation containing survey plat and type, location, and quantity of hazardous wastes will be submitted to the local land authority and EPA Regional Administrator or WDOE Administrator [40 CFR 265.119].
- YARL did not specify recording land use information on its deed [40 CFR 265.120].
- YARL did not propose to construct a final cover for the septic field [40 CFR 265.310(a)].
- YARL did not provide information on procedures to control runoff and to eliminate the escape of hazardous waste [40 CFR 265.111(b)].
- YARL did not specify the quantity of waste in storage prior to 1981. It also did not estimate the quantity of waste treated at any time during the life of the facility [40 CFR 265.112(a)].

8.0 COMMENTS ON THE GROUND-WATER MONITORING AND SOIL SAMPLING PROGRAMS

Specific comments on YARL's ground-water monitoring and soil sampling programs are listed below.

- YARL did not provide a detailed description of the regional hydrogeology to aid in determining the presence of interconnections between aquifers and the presence of perched aquifers. This information is needed to identify the uppermost aquifer, where all ground-water monitoring is required to be conducted. PRC was not able to determine whether YARL is monitoring the appropriate geologic formation or whether confining soil layers exist to prevent contaminant migration to lower aquifers, if present.

- YARL proposes to place downgradient monitoring wells at a distance of 50 feet from the drainfield. Ground water at the YARL site exists at a relatively shallow depth, and the soil horizon information does not indicate potentially significant lateral movement of contaminants. At such sites, ground-water monitoring wells should be placed as close as possible to the waste management unit to facilitate immediate detection of contamination in the uppermost aquifer.

- The WDOE report indicates that there is considerable variation in depths to the water table. However, YARL did not determine seasonal influences and the influence of pumping nearby wells on the depth to ground water. YARL also did not estimate the thickness of the aquifer. Lack of this information will complicate selection of vertical sampling depths.

- YARL did not determine whether the uppermost aquifer is homogeneous in nature. Thus, it will be difficult to ensure that a single upgradient well represents proper background levels of water quality.

- It should be noted that a single upgradient well does not account for spatial variability and increases the risk of incorrect indication of contamination.

- YARL did not provide information regarding seasonal influences on the direction of ground-water flow. This information is necessary to establish that upgradient sampling locations are not influenced by activities at the site.

- The rationale behind the selection of an air rotary drilling rig with a casing hammer is not understood. Although this method is excellent for monitoring well installations, the associated cost is substantially higher than for other drilling methods. U.S. EPA (1985) recommends the use of hollow-stem continuous augers for geologic environments which are similar to that at the YARL site.

- YARL did not mention whether compressor air from the drilling rig would be filtered to prevent introducing oil into the wells.

- YARL proposes to fill the annular space between the slotted screens and the wall of the borehole with filtered sand. Two feet of certified coarse grit sodium bentonite should be placed immediately above the sand pack. If at some wells the saturated zone extends beyond the screen, only certified coarse grit sodium bentonite should be used to fill the annular space.

- YARL proposes to use PVC pipes as well casing and screen material. PVC is known to leach or sorb organic compounds and to deteriorate when in contact with several hydrocarbons. YARL should use either Teflon or stainless steel 316 as well screen and well casing material in the saturated zone. PVC may be used as well casing material in the unsaturated zone.

- YARL did not specify the material composition of the submersible pump to be used for sampling. It should be noted that only Teflon and stainless steel 316 are recommended materials of construction.

- YARL did not provide information regarding sample container materials, preservatives to be used and holding times before sample analyses. YARL should ensure that the contracted laboratory is aware of the container material specifications, container cleaning procedures, preservation techniques, and holding times specified by U.S. EPA (1985).

- YARL did not specify the sample volumes to be collected for chloride, iron, manganese, phenols, and sodium analyses. Also, it proposes to collect 1,000-ml samples for gross alpha, gross beta, and radium analyses; U.S. EPA (1985) recommends a minimum volume of 1 gallon for analyzing these parameters.

- YARL did not mention using trip blanks.

- YARL did not describe the analytical procedures to be used for each parameter.

9.0 CONCLUSION

In general, YARL's closure plan does not appear to be intended for compliance with regulations specified in 40 CFR 265. The major focus of the plan is to formulate a ground-water monitoring and soil sampling program to determine necessary actions in accordance with WDOE regulations.

YARL's monitoring plan contains several technical deficiencies. In particular, well installation and sample handling procedures require revisions. Also, the monitoring plan does not appear to be based on sufficiently detailed site-specific information. Knowledge of the regional hydrogeology would help YARL to propose an optimum number of wells at appropriate locations, with an optimum number of piezometers at appropriate depths in each well.

APPENDIX A

COMPLIANCE CHECKLIST

Subpart G Closure & Post Closure

265.112 Closure Plan; amendment of plan

	Provided	Deficient
Detailed Description of partial and final closure procedure	yes	yes
Remarks:		

The closure plan does not provide detailed information regarding procedures to be followed for controlling or eliminating migration of hazardous waste off-site.

Description of maximum extent unclosed portion during facility life	yes	
Remarks:		

YARL proposes to close the septic tank drainfield system, but the tank itself will not be closed.

Estimate of maximum waste inventory in storage/treatment at any time during facility life	yes	yes
Remarks:		

YARL did not estimate the quantity of waste in storage prior to 1981. They also did not estimate the quantity of waste treated at any time during the life of the facility.

Equipment decontamination procedures	yes	
Remarks:		

Estimated year of closure	no	yes
Remarks:		

YARL did not indicate the estimated years of closure.

	Provided	Deficient
Location(s) and number of copies of closure plan	yes	yes

Remarks:

YARL did not mention keeping a copy of the closure plan at the facility.

Procedure for amending the closure plan	no	yes

Remarks:

YARL did not provide sufficiently detailed information on amending the closure plan.

265.113 Closure time allowed for closure

Description of closure schedule including		
- total time to close	yes	
- trackable intervening closure activities	yes	

Remarks:

265.117 Post-closure care and use of property (for land disposal only)

Description of post-closure care	yes	

Remarks:

YARL provided a post-closure contingency plan; however, it was not submitted for approval purposes. YARL anticipates waiver of post-closure requirements.

	Provided	Deficient

265.119 Notice to local land authority

Documentation of survey plat — no — yes
Remarks:

YARL did not mention submitting this document to the local land authority and EPA Regional Administrator.

Documentation of type, location, and quantity of hazardous wastes filed with local authority and EPA Regional Administrator — no — yes
Remarks:

YARL did not mention submitting these documents to the local land authority and EPA Regional Administrator.

265.120 Notice in deed to property

Documentation of Notice on Deed

- statement that land used to manage hazardous waste — no — yes
Remarks:

YARL did not mention recording such information on the deed.

- statement of restricted use per 265.117(c) — no — yes
Remarks:

YARL did not mention recording such information on the deed.

265.310 Specific closure-plan requirements for landfill

	Provided	Deficient
Procedures to control pollutant migration via groundwater, surface water, and air	no	yes

Remarks:

YARL did not propose to take necessary actions, such as covering the drainfield system with a final cover, for controlling and minimizing migration of liquids off-site.

Procedures to control surface water infiltration	no	yes

Remarks:

YARL did not propose to take necessary actions, such as covering the drainfield system with a final cover, for controlling and minimizing migration of liquids off-site.

Procedures to prevent erosion	no	yes

Remarks:

YARL did not propose to take necessary actions, such as covering the drainfield system with a final cover, for controlling and minimizing migration of liquids off-site.

Specific Post-closure Plan Requirements for landfill

Procedures to maintain the function and integrity of the final cover	N/A	N/A

Remarks:

YARL did not provide a post-closure plan.